QUALITY CONTROL
AND INDEPENDENT TECHNICAL REVIEW PLAN

Great Seneca / Muddy Branch Watershed

Montgomery County Department of Environmental Protection
Montgomery County, Maryland

General Investigation – Feasibility Study

June 2007

QUALITY CONTROL AND INDEPENDENT TECHNICAL REVIEW PLAN

1.0 PURPOSE

This plan presents the process that assures quality products for the Great Seneca Creek and Muddy Branch Watershed Study, a General Investigation (GI) feasibility study. This quality control (QC) and independent technical review (ITR) plan, herein referenced as the "review plan," defines the responsibilities and roles of each member assigned to the study and the technical review team.

The product to be reviewed by the technical review team is the integrated feasibility report, meaning that all required National Environmental Policy Act (NEPA) documentation is included. Under the provisions of U.S. Army Corps of Engineers (USACE) policy regarding peer review as detailed in Engineering Circular (EC) 1105-2-408 dated May 31, 2005, the ITR will be conducted by specialists from organizations outside of the Baltimore District, which is currently responsible for the study. Independent technical review will be conducted on all decision documents approved at the Headquarters USACE level and will be separate from the technical production of the project. This plan is an addendum to, and is by reference, a part of the project management plan which scopes the effort for this feasibility study.

2.0 APPLICABILITY

This document provides the quality control plan for the feasibility study. It identifies the quality control processes and independent technical review for all work to be conducted under this study authority, including in-house, sponsor and contract work.

3.0 REFERENCES

EC 1105-2-407 "Planning Models Improvement Program: Model Certification" (May 31, 2005)
EC 1105-2-408 "Peer Review of Decision Documents" (May 31, 2005)
EC 1105-2-409 "Planning in a Collaborative Environment" (May 31, 2005)
ER 1105-2-100 "Planning Guidance Notebook & Appendices"

4.0 GENERAL PROJECT DESCRIPTION

The study is being conducted under the Middle Potomac River and Tributaries authority - resolution of the U.S. Senate Committee on Environment and Public Works (dated 26 January 1956); resolution of the U.S. Senate Committee on Environment and Public Works (dated 6 July 1959) and resolution of the U.S. Senate Committee on Environment and Public Works (dated 23 May 2001). This authority states:

> *"That the Secretary of the Army is requested to review the Report of the Chief of Engineers on the Potomac River and Tributaries in Maryland, Virginia, and Pennsylvania published in House Document 343, 91st Congress, Second Session, and other pertinent reports, with a view to conducting a study, in cooperation with the States*

of Maryland and West Virginia, the Commonwealths of Pennsylvania and Virginia, and the District of Columbia, their political subdivisions and agencies and instrumentalities thereof, other Federal agencies and entities, for improvements in the interest of the ecosystem restoration and protection, flood plain management, and other allied purposes for the middle Potomac River watershed."

Under this authority, the first action by the Corps was to complete a reconnaissance study for the Middle Potomac study area. The Middle Potomac Watershed 905(b) (WRDA 86) Analysis report, dated January 2004, recommended that the Corps of Engineers conduct multiple feasibility studies in the study area, including one for the Great Seneca Creek and Muddy Branch watersheds. These studies would take a sustainable watershed management approach, covering multiple purposes (e.g. ecosystem restoration, flood control, water quality improvements). USACE Headquarters certified the reconnaissance phase and the 905(b) report in May 2004 and gave permission to initiate negotiations with non-federal sponsors in the Great Seneca Creek/Muddy Branch watershed, as outlined in the 905(b) report.

The legislative authority for this feasibility study allows for a comprehensive watershed approach to restoring Great Seneca Creek and Muddy Branch. It will look broadly at the watershed level, identifying priority sub-watersheds and making project recommendations for these priority sub-watersheds for further design and implementation. Designs for stream restoration and new/retrofit storm water management will be developed as part of an overall watershed restoration plan. Additionally, each feasibility-level design will have a monitoring plan associated with it to insure for the long-term, that specific project goals and desired improvements to the watershed, as a whole, have been reached. Great Seneca Creek and Muddy Branch are two distinct watersheds that are being studied in similar fashion but independently of each other. The team expects to prepare one final feasibility report that documents plan formulation efforts, the recommended plan, and NEPA information for both of the Great Seneca Creek and Muddy Branch watersheds together.

The benefits of restoring the Great Seneca Creek and Muddy Branch watersheds will not only be the restoration of individual watersheds, but also the restoration of a small but significant component of the Potomac River sub-basin and the Chesapeake Bay drainage basin.

The study area is defined as the Great Seneca Creek and Muddy Branch watersheds, which are located in Montgomery County, Maryland. The total drainage area of the combined watershed is approximately 94 square miles and includes 268 total stream miles. The Great Seneca Creek watershed measures 75 square miles and contains over 210 miles of stream. The Muddy Branch watershed measures 19 square miles and contains 58 miles of stream, of which 28 stream miles are routed through the urbanized City of Gaithersburg.

The project team is comprised of representatives from USACE's Baltimore District, as well as the project's non-federal sponsor, Montgomery County. The Montgomery County team members involved in the project include staff from the Montgomery County Department of Environmental Protection and the Maryland-National Capital Park and Planning Commission (MNCPPC). Other non-federal interests include representatives from the City of Gaithersburg, who have conducted and contributed ecological and biological assessments of stream conditions in each

watershed. The Baltimore District project team includes representatives from Planning, Engineering, Real Estate, Construction, Contracting, and Programs and Project Management Divisions, as well as the Office of Counsel and the Resource Management Office.

5.0 REVIEW REQUIREMENTS

Initial quality control (QC) review will be handled within the Corps section or branch office performing the work or by staff in the corresponding sponsor jurisdiction when the work involves in-kind services. Additional QC will be performed by the project team during the course of completing the integrated feasibility study. The detailed checks of computations and methodology should be performed at the District level, and the processes for this level of review are well established.

Pursuant to EC 1105-2-408, item 2c(2), any models used in the preparation of decision documents covered by that circular will be reviewed in accordance with EC 1105-2-407, *Planning Models Improvement Program: Model Certification,* and are not subject to the requirements of the [1105-2-408] circular. The uses and applications of models in individual studies that lead to the preparation of decision documents will be reviewed in accordance with its requirements by the related discipline(s) as part of this technical review.

Pursuant to EC 1105-2-408, because this study leads to a decision document requiring authorization by Congress, as well as recent guidance, an ITR team will be assigned by the Planning Center of Expertise (PCX) for Environmental Restoration (National Ecosystem Restoration) Projects. Dr. Dave Vigh (CEMVD-RB-T) of the appointed PCX will assign this team. It is recommended that an ITR handled entirely within USACE will satisfy the peer review requirements, as the risk and magnitude of the proposed project do not warrant an external peer review (EPR) based upon the initial risk screening process conducted by the project study manager, as noted in Section 9. It is anticipated that while this study will be challenging and beneficial, it will not be novel, controversial or precedent-setting, nor will it have significant national importance. As a result, the ITR will focus on:

- Review of the planning process and criteria applied,
- Review of the methods of preliminary analysis and design,
- Compliance with project authority and NEPA requirements,
- Completeness of preliminary design and support documents, and
- Assessment of interdisciplinary coordination.

6.0 REVIEW PROCESS

It is anticipated that the ITR process will begin after the ITR team has been assigned, and will initially include review the project management plan and the models to be used in the preliminary analysis. As alternative plans are formulated, the review process will focus on data, assumptions, and the engineering, scientific, economic, social and environmental analysis.

The major milestones of the review process are listed below, with all North Atlantic Division (NAD) required meetings indicated by a “P”:

- Approval of review plan by NAD
- ITR team assigned by PCX
- P-6 read-ahead materials (RAM) to ITR
- P-6 feasibility scoping meeting
- P-7 RAM to ITR
- P-7 plan formulation meeting
- P-8 RAM for Alternative Formulation Briefing
- Alternative Formulation Briefing
- Draft report review
- Civil Works Review Board
- Final report review

7.0 REVIEW COST

The cost of the ITR will be negotiated between the Baltimore District and the PCX. It is assumed that documents to be reviewed will be transmitted electronically to the assigned ITR members. Comments will be recorded using DrChecks software if technical in nature; otherwise another suitable format will be coordinated directly with the ITR member. All comments will be provided electronically to the Baltimore District study manager. It is also assumed that the ITR team will be working virtually. Only under extreme circumstances should the ITR team, or a representative of that team, be required to physically attend team or milestone meetings. The ITR team should participate in all P milestone meetings via conference call or video teleconference.

8.0 REVIEW SCHEDULE

Development of a preliminary schedule for this environmental restoration study was accomplished during the reconnaissance phase. The preliminary milestone schedule reflected in the 2004 project management plan assumed that appropriate funding for the study was provided in subsequent fiscal years to effectively accomplish the study.

Note that since the September 2004 commencement of this study preceded the requirement for PCX involvement and development of this review plan, the review schedule below differs from the major review process milestone list in section 6 above.

TASK	**START DATE**	**FINISH DATE**
Develop review plan and post to website, PCX	15 Apr 2007	29 June 2007
Identify regional ITR resources and recommend ITR plan to PCX	2 July 2007	13 July 2007
PCX assigns/approves ITR team	13 July 2007	25 July 2007
ITR team review of Feasibility Scoping Meeting documents	Waived (since study beyond this point)	
Feasibility Scoping Meeting	May be conducted as an IPR or at AFB*	
Review of models (by PCX/ITR)	TBD-If Needed	
ITR review of P-7 RAM (formulation analysis)	13 June 2007	19 July 2007
P-7 Meeting	19 July 2007 (if team in place)	

Preparation for Alt. Formulation Briefing (AFB)	Fall 2008	
Alternative Formulation Briefing	Fall 2008	
Submission of draft feasibility report	Mar 2009	Aug 2009
Civil Works Review Board	Fall 2009	
Submission of final feasibility report	Spring 2010	

9.0 PROJECT RISK

An initial project risk assessment was conducted by Baltimore District's study manager. Ultimately, the assessment of risk will be defined in coordination with the entire project team and the PCX. For this exercise, an assessment was made of the risk associated with this project based upon five factors and the project was rated quantitatively among five levels of project risk, ranging from low to high (risk score class). All five factors were weighted equally and are described further below. The rater considered previous District project experiences when making this analysis. No attempt was made to tie this risk to a national scale of rating; however, it is assumed that the PCX will bring this perspective to their assessment of the rating.

- Risk inherent in project complexity deals with the potential that the project will fail after it is ultimately constructed.
- Customer expectation risk is a measure of the level of expectation of the sponsor and the risk that we may not be able to meet them.
- The project schedule and cost were assessed a low degree of risk if they both remained flexible, and a high degree of risk if the project schedule and cost were to become fixed.
- Staff technical experience was assessed as a low degree of risk if the staff had a high level of ecosystem restoration experience, and a high degree of risk if the staff had minimal experience.
- The impact of project failure and the subsequent consequences are determined based on preliminary future, without project scenarios in conjunction with sponsor and technical team member input.

The score for the risk items were summed and the average value of the risk assessment scores was used to determine overall project risk level (Table 9.1). Based upon this analysis by the Corps study manager, the project is projected to carry low-to-medium level of risk with a score of 2.8. The results of the evaluation are tabulated as follows:

Table 9.1 Quality Control/Review Plan Score Guide

Project Risk Item	**Risk Assessment Score (Low Degree to High Degree)**					**Score**
	Low		**Medium**		**High**	
Project Complexity	1	2	3	4	5	**2**
Customer Expectation	1	2	3	4	5	**3**
Product Schedule/Cost	1	2	3	4	5	**2**
Staff Technical Experience	1	2	3	4	5	**3**

Failure Impact and Consequences	1	2	3	4	5	**2**
Average Project Risk Assessment Score					➔	**2.8** **Low-to Medium Risk**

10.0 REVIEW PLAN

The components of the review plan were developed pursuant to the requirements of EC 1105-2-408.

10.1 Team Information

The decision document that will be the ultimate focus of the peer review process is the integrated feasibility report, which will include an environmental assessment. The purpose of the decision document will be to begin the approval process leading to project authorization and project implementation.

The current project team is listed below. This list provides the points of contact of Baltimore District (NAB) team members that are available to answer specific technical questions as part of the review process. The list also provides the names and organizations of the non-federal sponsors and participating outside entities.

District Project Team Members:

CENAB-PP-C
Project Manager

CENAB-PL
Study Manager

CENAB-EN-WC
Senior Design Manager

CENAE-EP-VC
Regional Economist

CENAB-PL
Environmental Specialist

CENAB-PL
Cultural Resource Specialist

CENAB-EN-GH
Senior Hydraulic Engineer

CENAB-EN-WW
Hydraulic Engineers

CENAB-EN-WE
Civil Engineer

CENAB-EN-C
Cost Estimator

CENAB-RE-C
Real Estate Specialist

Sponsor Team Members

Donald Dorsey
Department of Environmental Protection
Planner
Montgomery County, Maryland
(240) 777-7712

Doug Redmond
Maryland-National Capital Park and
Planning Commission (M-NCPPC)
Biologist
Silver Spring, Maryland
(301) 650-4367

Mark Wilcox
Department of Environmental Protection
Engineer
Montgomery County, Maryland
(240) 777-7768

Erica Shingara
Office of the City Manager
Gaithersburg, Maryland
(301) 258-6310

Independent Technical Review (ITR) Team

Based on early project coordination with Norfolk District (NAO), it is recommended to the PCX that NAO be the approved ITR team selection. When the official ITR team is determined, the name, organization and discipline for the team members will be provided below:

Hydraulic Engineering
Civil Engineering
Real Estate
Planning
Ecology
Cost Engineering
Economics

10.2 Scientific Information

Based upon the self-evaluation by the project team, it is unlikely that the feasibility report will contain influential scientific information. The environmental restoration measures that were identified within the 905(b) analysis will be evaluated using standard engineering, environmental and economic processes, and the engineering and economic models that have been developed and approved by Corps of Engineers for use in planning studies. These models include: HEC-HMS and HEC-RAS.

A formulation method using, extensive GIS analysis of the watershed will be used as the assessment tool to optimize the sites for restoration. During the initial screening, the project team will utilize existing biological, hydrologic and other data to prioritize subwatersheds in need of restoration based on certain characteristics. The team anticipates choosing subwatersheds that represent approximately ¼ of the total area of both watersheds.

Site visits to representative stream reaches within each prioritized subwatershed will be conducted to verify that the data used to screen the subwatershed reaches accurately represents existing conditions which present a restoration opportunity. These visits and the observations

made will serve as the second site selection tool. After the initial screening and site visits are complete, specific stream reaches can be identified. The study team anticipates that 1/8th, or approximately 30 stream miles, will be found worthy of more in-depth analysis.

The selected stream lengths will be walked and assessed using protocols to be identified by the study team. The team will note habitat, stream stability, problems and opportunities for restoration, construction access points, and other features. The sites that are found to have fatal flaws will be dropped from further consideration. Concept-level plans will be developed for the selected project sites and used to develop preliminary cost estimates for implementation. The final screening of sites will evaluate problems, potential, and cost for the restoration.

It is anticipated that there will be multiple project elements identified in the recommended plan. These sites may include up to 15 stream miles of stream restoration, and five new and ten retrofit stormwater management opportunities.

10.3 Timing

The ITR process is envisioned to begin in summer 2007 with an assessment of the engineering (hydrologic/hydraulic) models, virtual participation in the P-7 meeting, and the engineering methods to be used in the evaluation and comparison of alternative plans in this feasibility study. It is anticipated that work would start within one week of assigning the ITR team. The estimated schedule is noted in section 8 of this review plan.

10.4 External Peer Review Process

No external peer review (EPR) is deemed necessary at this time, although this assumption will be confirmed with the PCX. According to requirements set forth in EC 1105-2-408, the feasibility study will not present novel methods or models, present complex interpretations, have conclusions that change prevailing practices, impact public safety or affect significant policy decisions. This assessment is supported by the evaluation of the project team in April 2007 noted in section 5 and tabulated in section 9 of this review plan.

10.5 Public Involvement

Public meeting dates have not been scheduled at this time but are anticipated after major milestones are met. Public involvement activities will be on-going throughout the study phase.

10.6 ITR Reviewers

It is anticipated that six to seven reviewers should be available in the following disciplines: hydraulic engineering, civil engineering, real estate, ecology, economics, cost estimating and planning. Section 10.1 of this review plan will be updated to reflect specific reviewer contact information once the ITR team is assigned by the PCX.

The expertise that should be brought to the ITR team includes the following:

1) Hydraulic Engineering – The reviewer(s) should have extensive knowledge of principles of fluid geomorphology and natural stream channel design (i.e. Rosgen methods). The reviewer(s) should also have a solid understanding of hydraulic modeling, erosion, sediment transport and bank protection measures.

2) Civil Engineering – The reviewer should have knowledge of surface water hydrology, TR-20 and TR-55 models produced by the Natural Resource Conservation Service, as well as AutoCAD Land Development desktop and Arc GIS (version 9.1) mapping software.

3) Real Estate – The reviewer should have knowledge of land acquisition process, permit review and land appraisal.

4) Planning – The reviewer should have recent experience in reviewing plan formulation processes for multi-objective studies and be able to draw on "lessons learned" in advising the project team of best practices.

5) Ecology – The reviewer should have a solid background in the restoration of freshwater wetlands and upland habitats, and understand the factors that influence the reestablishment of native species of plants and animals.

6) Cost Estimating – The reviewer should have recent experience in concept-level estimating for stream restoration and storm water retrofit projects. It is anticipated that the M-CACES cost estimate will be reviewed by the USACE center of expertise in Walla Walla District.

7) Economics – The reviewer should have a solid understanding of economic models including cost-effective incremental cost analysis (e.g. IWR Plan suite) and their application to ecological restoration and public perception of risk.

10.7 External Peer Review Selection

There is no external peer review (EPR) selection because EPR is not anticipated for this study. Should it be determined that EPR is required, a selection process will be crafted and presented in an update to this document.